

REMARKS

Claims 1-2 and 4-11 are pending in the application.

Claims 4-11 were withdrawn from consideration.

Claim 1 was rejected under 35 U.S.C. §103(a) as being unpatentable over Ohashi et al., U.S. Patent No. 6,376,345, in view of Matsuo et al., U.S. Patent No. 6,296,714. Claim 2 was rejected under 35 U.S.C. §103(a) as being unpatentable over Ohashi et al., in view of Matsuo et al., and further in view of Klebanoff, U.S. Patent No. 6,169,652.

The Examiner, in his Advisory Action dated June 8, 2004, indicated that “Applicants argue that even if such a combination of Ohashi and Matsuo were found, radiating light having a wavelength of 500 nm to less than 1 microm for the purpose of reducing the electromotive force at the PN junction in a semiconductor, thereby inhibiting galvanic effects due to photoexcitation before or after a step including CMP, would not have occurred to those skilled in the art. This argument does not commensurate with the scope of claim 1 because claim 1 does not recite ‘radiating light having...for the purpose of reducing...including CMP’.” Applicants have amended claim 1 to meet the objection of the Examiner, except that claim 1 has been amended to further indicate that the galvanic effects are inhibited due to photoexcitation before, during, or after a step including CMP, which is supported by the specification, on page 6, lines 1-6, and 14-20.

The Examiner, in the Advisory Action, further indicates that, “It is argued that Ohashi is an anti-corrosion treatment which is carried out following a planarization step, and is aimed for removal of undesired chemicals whereas the aim of the cleaning process of the present invention is to prevent oxidation of the surface of wiring by means of irradiating light. This argument does not commensurate with the scope of claim 1 since claim 1 does not require ‘to prevent oxidation

of the surface by of wiring by mean of irradiation with light’.” Applicants have, likewise, amended claim 1 to meet this objection of the Examiner with regard to the scope of claim 1. This amendment is supported in the specification, by for example, on page 6, lines 1-6.

In addition, Ohashi et al. teaches illuminance of light (i.e. 500 lux or less, 300 lux or less, or 100 lux or less) inside an immersing bath, while wafers are stocked in the immersing bath so that the wafers do not become dry. Ohashi et al. discloses that CMP apparatus 100 prevents “the surface of the stocked wafer 1 from being illuminated with an illuminating light”, (column 14, lines 62-66). Furthermore, a typical illuminating light includes light having a wavelength of 500 nm or less. Therefore, the light having the illuminance described in the Ohashi patent includes light having a wavelength of 500 nm or less. In contrast, the present invention was made based on a finding that irradiation with light having a wavelength of 500 nm to less than 1 μ m inhibits galvanic effects during a cleaning step. As described in the “Related Art” section of the present specification, wafer sensors and the like using a wavelength of 1 μ m or less are installed in silicon wafer transport systems, (page 5, lines 2-3), and visual inspection of wafers is required. The present invention allows both an operation of such a wafer sensor and visual inspection by using light having a wavelength of 500 nm or less, as well as inhibition of galvanic effects caused by photoexcitation within a semiconductor substrate. This effect cannot be attained just by selecting the illuminance of the light to a predetermined value as described in the Ohashi patent.

As described above, the present invention is made based on this new finding which is not suggested nor taught by Ohashi et al., and the usage of light having a wavelength of 500 nm to less than 1 μ m would not have been obvious to one skilled in the art from the Ohashi patent which merely teaches illuminance of light.

As argued in the Response to Office Action under 37 C.F.R. 1.116 filed on May 20, 2004, Klebanoff teaches an electrostatic chuck for holding a wafer or a substrate, which is not directly related to either cleaning or CMP. Therefore, it would be difficult to conceive of a combination of Klebanoff with Ohashi and Matsuo.


Although grounding of the chuck may contribute to prevention of static electricity and reduction of dust deposition, the effects of the present invention, namely reduction of the electromotive force at the PN junction in a semiconductor substrate and prevention of galvanic effects due to photoexcitation, would not be obvious. Accordingly, the combination of Klebanoff with Ohashi and Matsuo would not lead to the invention of claim 2.

It is to be noted that the Examiner did not respond to these arguments with regard to Klebanoff in the Advisory Action mailed on June 8, 2004.

In view of the above remarks, it is believed that claims 1 and 2 are in condition for allowance, which action is respectfully solicited. However, if for any reason the Examiner should consider this application not to be in condition for allowance, the Examiner is respectfully requested to telephone the undersigned attorney at the number listed below prior to issuing a further Action.

Any fee due with this paper, not fully covered by an enclosed check, may be charged on
Deposit Account 50-1290.

Respectfully submitted,



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